

# Idaho Department of Fish and Game



## LAKE PEND OREILLE PREDATION RESEARCH QUARTERLY REPORT

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### Spring Sonic Tagging Efforts

During the months of April, May, and June we worked with Lake Pend Oreille fishermen and set gillnets to collect large (> 4 lbs) predators for tagging. Seven lake trout, six bull trout, and three northern pikeminnow were successfully tagged and released. Two rainbow trout were collected but neither of them survived before release. Lake trout weighed an average of 10 lbs (30"), bull trout averaged 7.1 lbs (27"), and all northern pikeminnow weighed about 4 lbs each (average 22"). These fish will be tracked during the month of August to determine their depth distribution while the lake is stratified. This information will be useful as we enumerate and identify pelagic fish targets observed from hydroacoustic data that will be collected during August surveys. This is the first attempt to track bull trout using sonic transmitters in Lake Pend Oreille (Figure 1) and the habitat data we collect will be used to help identify critical areas for bull trout survival.

One interesting observation we made during our fall, 2002 and spring, 2003 tagging efforts is our high mortality rate of rainbow trout. Most of these fish were captured by hook and line and this brings

up the possibility of an unknown mortality rate associated with catch and release techniques. We suspect that during hook and line capture and subsequent transporting to tagging areas we induce a highly stressful environment for these large rainbow trout. Due to high effort and low capture rates of rainbow trout during this spring, we will focus our efforts in tributary spawning areas of Lake Pend Oreille next spring and be able to track rainbow trout during August of 2004.



**Figure 1.** An 11.5 lb, 26.5" bull trout being placed in a holding pen immediately after a sonic transmitter was surgically placed inside the fish's abdomen. This is our largest bull trout that we have tagged and will track in Lake Pend Oreille. Photo by Shannon Dickson

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## Rainbow Trout Spawning Run

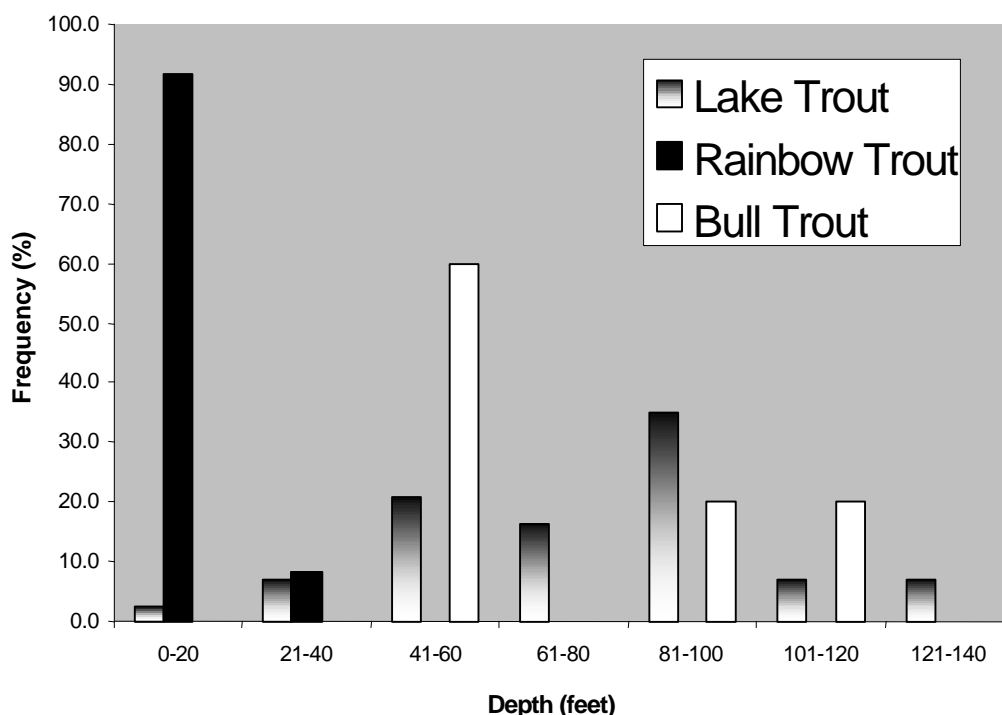
During February and March of 2003 we were able to locate our three sonic-tagged rainbow trout on a weekly basis. These rainbow trout were monitored to see when they would migrate from Lake Pend Oreille and enter spawning tributaries. A large male (14.3 lbs, 31") was the first fish to leave the lake. The fish was found on 13 February by Trestle Creek and not found again until 19 May just south of Pearl Island. Our other male (7.5 lbs, 26.5") was last found on 10 March near Hope, Idaho but has not been located since then. Our female (7.5 lbs, 27") was the last fish to leave the lake. She was located on 25 March near Deadman Point and then not found again until 6 May when she was located by Indian Point. Based on the time when our fish left the lake and then returned, spawning most likely occurred in April. A fisherman caught our large male on 23 May, only five days after we found the fish. The fisherman returned the sonic transmitter to us and noted the fish weighed 12.0 pounds. Due to weight loss and a long absence from the lake, we feel the fish actually spawned without being negatively affected by the inserted sonic tag.

Though 67% (2 out of 3) of our tagged rainbows emigrated back to the lake, capturing and tagging fish in the spawning tributaries may provide us with an alternate and cost efficient way to collect large rainbow trout. During April, fish will be concentrated in certain tributary streams and vulnerable to capture. We would not have to rely on fishermen or gillnetting in the fall, both which take a large amount of time and effort. Now we just have to wait until next spring to try this technique.

## Spring Habitat Use of Rainbow, Lake, and Bull Trout

Large Lake Pend Oreille predators were tracked during springtime to determine depth distribution and to help evaluate the feasibility of performing a springtime hydroacoustic survey to estimate pelagic predator abundance (Figure 2). Spring habitat use for rainbow and lake trout was monitored bi-weekly from 21 March through 21 June. Bull trout were monitored for habitat use from 16 June through 21 June. As stated earlier in this report, our tagged rainbow trout were absent from the lake from either mid-February or mid-March to about mid-May. Before our rainbows left the lake to enter spawning tributaries they were occupying the upper 20 ft of the water column in water temperatures of approximately 41° F. When the fish moved back into the lake after spawning they still occupied the upper 20 ft of the water column. By June fish were mostly found in the 12-25 ft range in temperatures ranging from

55° F to 60° F. Lake trout tended to stay deeper during the springtime (40-140 ft) but occasionally we observed lake trout in the top 40 feet of the water column, possibly feeding on kokanee. Lake trout preferred temperatures of approximately 50° F but were found in temperatures ranging from 40° F to 54° F. Most of our lake trout observations (98%) were made of fish not in the pelagic area but very close to shore and near the bottom. Though we did not start tracking bull trout until the end of spring, all fish that we located were occupying water depths of 50 to 120 ft in temperatures below 50° F. All of our bull trout were found to be close to shore and near the bottom.

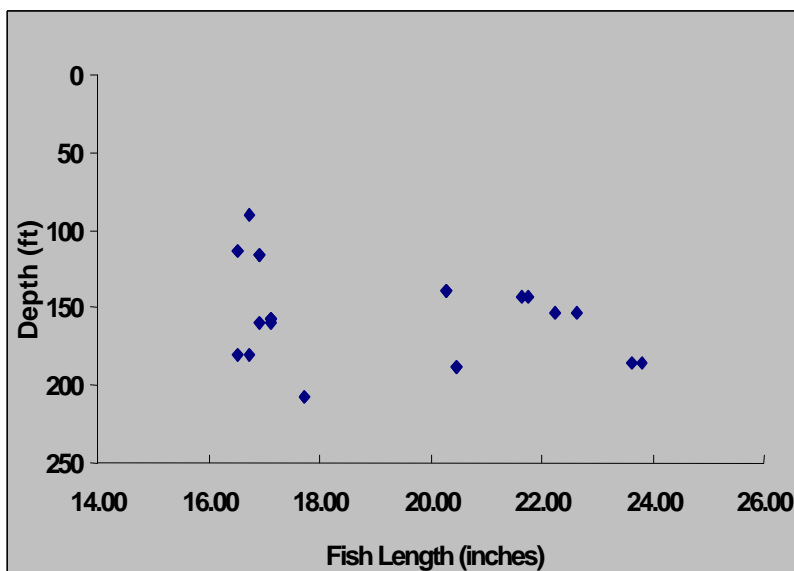


**Figure 2.** Spring habitat use (depth) of rainbow, lake and bull trout in Lake Pend Oreille. Bull trout habitat use was only identified from 16 June to 21 June.

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## Spring Hydroacoustic Survey for Large Pelagic Predators

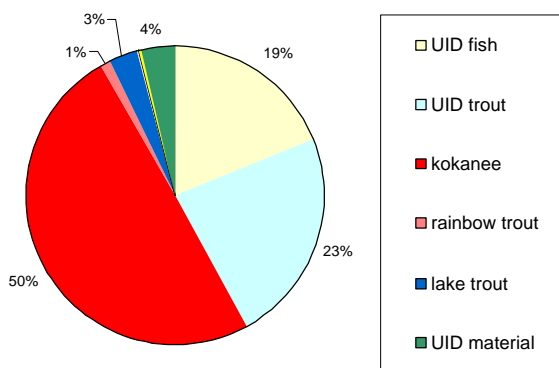
On 28 and 29 May we conducted a hydroacoustic survey to determine habitat use and to investigate the feasibility of performing a spring population estimate for pelagic predators just as we did in December of 2002 and February of 2003 (see the last two quarterly reports for results). Acoustic data from our nighttime survey was processed and shown in Figure 3. Acoustic data from our daytime survey only showed two large pelagic fish from the middle and southern section of the lake. Large pelagic targets at night were only observed in the northern part of the lake (See Figure 6, pg 4 for transect location-Tran 3-5). Large pelagic fish were found at depths between 90 and 200 ft, in water < 45° F. We are uncertain what these fish are since our tracking data revealed mostly benthic observations of bull trout and lake trout although we did find these two species at those depths. However, none of our lake trout or bull trout observations were from the area where the acoustic data were collected. Our tagged rainbow trout were found high in the water column and no acoustic targets were detected above 90 ft. We concluded that spring is most likely an ineffective time to estimate the population size of pelagic predators.



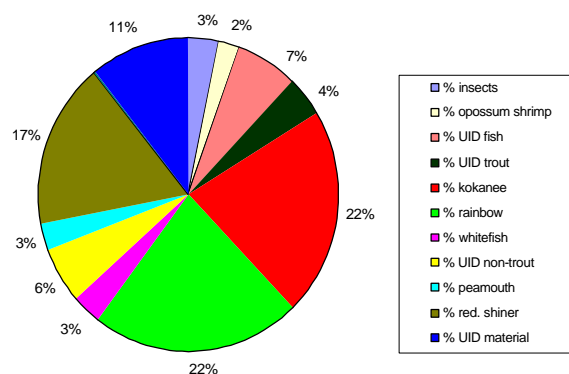
**Figure 3.** Nighttime depth distribution of large pelagic fish recorded from our spring hydroacoustic survey. All of these pelagic targets were found over water depths > 250 ft.

Looking back on our 2002 pelagic predator population estimate we found that 73% of the population was comprised of fish between the sizes of 15" to 22". This of course is a significant portion of the pelagic fish population that we are interested in identifying, due to the impact it may have on the kokanee population. Diet and bioenergetic research performed by Dmitri Videgar from the University of Idaho in 2000 indicated that the Lake Pend Oreille rainbow trout population, ranging in sizes from 16" to 20", consumes a substantial amount of kokanee. However, he did not come to this same conclusion for lake trout

## Diets of Rainbow and Lake Trout 15" to 22"



**Figure 4.** Diets of 75 lake trout 15" to 22". Data was summarized from Dmitri Videgar's 2000 Masters Thesis.



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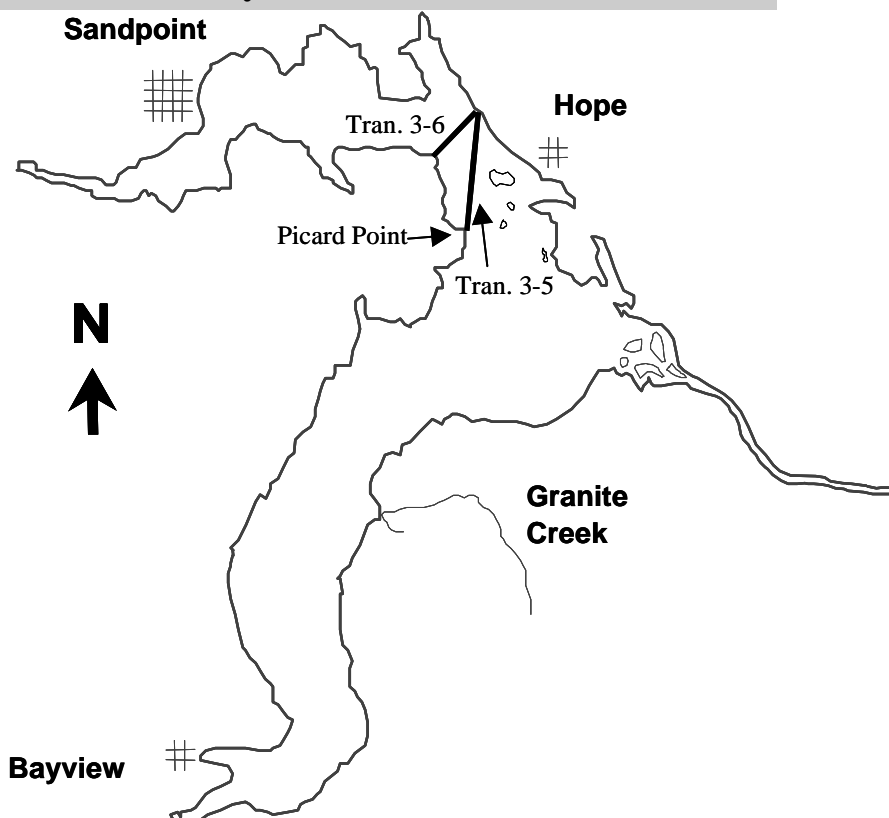
due to the fact that he estimated a very low number of lake trout in the lake. Based on IDFG creel data and recent gillnetting we know the lake has a high abundance of lake trout, though a population estimate is unknown. Recently we examined Videgar's lake trout diet data and found he had 75 lake trout ranging from 15" to 22" and the question was: What were these fish eating? To no surprise small lake trout consumed a lot of small prey size fish (96% of their diet) (Figure 4). Fifty percent of their total diet (by weight) consisted of kokanee ranging in size from 3" to 8" with an average of 6". Forty-two percent of their diet (by weight) consisted (*Continued of Page 4*)

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## Unidentified Pelagic Fish Community in Northern Lake Pend Oreille

During our 2002 summer hydroacoustic survey we identified two groups of large pelagic fish. One group was mostly (97%) found at depths between 30 and 115 ft over very deep water (> 500 ft). The other group was mostly found (65%) at depths between 130 and 230 ft in relatively (relative to Lake Pend Oreille!!!) shallow water (< 330 ft) (the remaining 45% was found over water > 500 ft). This second community of fish was found in two hydroacoustic transects (3-5 and 3-6) in the northern end of Lake Pend Oreille (Figure 6). Consequently, these two acoustic transects had the highest and third highest fish densities (transect 3-6 and 3-5, respectively) out of all acoustic transects sampled (total of 28). The average fish length for this unidentified community was 19" and ranged from 15" to 29".

Once we complete our 2003 summer hydroacoustic survey we will again look for this community, and if found, we will try to determine its species composition. Right now we are uncertain if this community is comprised mostly of kokanee predators, pelagic lake whitefish, or perhaps some other species.



**Figure 6.** Map of Lake Pend Oreille showing location of 2 hydroacoustic transects, 3-5 and 3-6. Hydroacoustic data is collected throughout the entire course of the transect with an average boat speed of 2.2 mph.

### New Happenings

During this past quarter he hired a new bio-aide, Matt Gearhiser, to help with the predation project. Matt started work on 9 June and has already been an asset to the project. Matt moved from Ohio where he was working as a research technician for Ohio State University's Aquatic Ecology Laboratory.

Also during this past quarter we ordered an omnidirectional hydrophone with 100 ft of cable. This new hydrophone will help us locate tagged predators throughout the lake. One advantage the new hydrophone has is that it can be towed at slow speeds while searching for fish. Once a fish is heard we can use our directional hydrophone to pinpoint its location. Also with the new hydrophone we can increase our search range by lowering the hydrophone down under the thermocline.

(Continued from Page 3) of other salmonids and unidentified fish. The rest of their diet was made up of small lake trout, rainbow trout, and unidentified non-fish material. The surprise to us was that not one of those 75 lake trout had opossum shrimp in their stomachs. The same size rainbow trout (15" to 22" n=22) were also examined (Figure 5). We found that only 22% (by

### Activities for Next Quarter

During this next quarter we will perform a lake-wide pelagic predator population estimate. We will determine habitat utilization of bull and lake trout as well as northern pike-minnow during summer stratification. We will perform gill-netting in areas where we have unknown pelagic fish communities, particularly in the northern end of the lake. We will continue working on our 2002-2003 annual report and start preparing 2002 hydroacoustic echograms for statistical analysis.

weight) of their diet was kokanee, 60% of their diet consisted of other fish including rainbow trout, and the remaining 18% consisted of non-fish items.

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